DOI: 10.24904/footbridge2017.09534

WALKING ON A SPIDERS WEB
SOFIE'S BRIDGE

Poul Ove JENSEN
Architect, Director bridges
DISSING+WEITLING
Copenhagen, Denmark
POJ@dw.dk

Steen Savery TROJABORG
Architect, CEO Partner
DISSING+WEITLING
Copenhagen, Denmark
SST@dw.dk

Jesper B. HENRIKSEN
Industrial Designer, Partner
DISSING+WEITLING
Copenhagen, Denmark
JHE@dw.dk

1. Introduction

Sofiero is former summer retreat for the Swedish royal family near Helsingborg, Southern Sweden. The park belonging to the castle, is a major tourist attraction. It is divided in two by a deep ravine and the present owner, the City of Helsingborg, wanted to built a footbridge that connected the two parts of the park. At the same time it should serve as a viewing platform from where an outstanding collection of rhododendruns, that grow in the microclimate of the ravine, could be admired.

Three architectural firms were invited to submit a proposal for the bridge, BIG and Dissing+Weitling from Denmark and Wingårdh from Sweden. Three very different firms that also presented very different ideas. It was not a design competition in the normal sense, but socalled parallel assignments as it is common in Sweden. Our scheme was prepared in collaboration with Schlaich Bergermann Partner and was eventually selected for realization.

The brief was simple. A pedestrian bridge across the ravine, 3 m. wide. The approximate location was fixed, determined by the existing footpaths and it was emphasized that the budget was extremely low. Apart from that there were no preconditions.

2. Initial Considerations

When we first visited Sofiero we were taken in by the site. The castle and the park. Its drama and poetry. The cliff along the coast. The lush vegetation culminating in an explosion of colours when the rhododendrons bloom. The winding pathways that take visitors through the park with constant change of viewpoint. This is pure magic. What kind of a bridge do you build in a place like that. It had to be more than a convenient connection across. It had to be an attraction in itself, but without overpowering the surroundings.

The width of the ravine was about 60 m. and it became clear at the first site visit when we saw the dense and lush vegetation that it had to be a single span. Intermediate piers – including temporary supports - in the ravine were simply not acceptable.

We looked at several different options, the goal being something as light and transparent as possible. The first thought was a stressed ribbon. It could have been an elegant solution, but it turned out that the soil conditions along the ravine were so bad that to establish the necessary anchorage would be extremely difficult and prohibitively expensive. The conclusion was that supports near the edge of the ravine affected by horizontal forces should be avoided.

We did looked at cable-supported structures, suspension and cable-stayed in order to achieve lightness , but we quickly came to the conclusion that the masts and the cables would interfere unfavourably, physically as

well as visually, with the branches of the beautiful old trees in and along the ravine. We also looked at arches and trusses, but agreed that they would be too dominant in the romantic parkscape.

3. Final Design

Our conclusion was that the right solution, from a technical as well as an architectural point of view, was a bridge that could be dropped down on the abutments as a structurally self-contained unit delivering a vertical load only. We first looked at a fish-bell shaped steel box girder, 30 cm. deep at the abutments and 130 cm. at mid-span. It could have been an elegant bridge, but it lacked the lightness and transparency we were after. So we started to look at slender girders reinforced by underslung cables.

Another issue was the horizontal alignment of the bridge. Beam bridges like to be straight, but here a straight bridge looked rigid and oddly out of place. We wanted the bridge to merge seamlessly with the winding footpaths in the park. A bridge with an S-shaped alignment would do that and at the same time turn the crossing of the ravine into an event.

Structurally an S-shaped beam bridge is a challenge. Our solution was a simply supported beam conjugated to a suspension cable underneath it. The main girder is composed of a straight steel box with a curved cantilevered deck connected to its top. The deck is stiffened by equally spaced ribs of steel plates. The suspension cable system consists of V-shaped struts connecting the main girder to a catenary cable which is fixed at the ends of the bridge.

Fig. 1. View from the ravine, D+W

4. Details

When passing a pedestrian bridge people move slowly and often pause to enjoy the view. They look at the details of the bridge and they actually touch them. Therefore the detailing and the materials and finishes are of paramount importance.

The steel structure of the bridge has a silvery glossy coating. The railings have V-shaped posts with an in-fill of stainless steel mesh. The handrails are of laminated wood and have built-in LED lighting. The pavement is a two-component polymer coating with a skidproof natural stone granulate topping in a colour similar to the pebbles on the footpaths.